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Dominion®

November 24, 2010

Ms. Anita Riggleman
Virginia Department of Environmental Quality
PO Box 3000
Harrisonburg, VA 22801

Re: Comments of Virginia Electric and Power Company
Warren County Combined Cycle Project
Prevention of Significant Deterioration Permit
Registration No. 81391
Plant ID No. 51-187-0041

Dear Ms. Riggleman:

Dominion is pleased to submit the attached comments on the above referenced project.

If you have any questions regarding these comments or any other questions relating to the proposed facility, please contact Andy Gates at 804-273-2950 or andy.gates@dom.com.

Sincerely,

Pamela F. Faggert

Pamela F. Faggert

Enclosure

Comments of Dominion Virginia Power on its Warren County Power Station Proposed Prevention of Significant Deterioration Permit No. 81391

Virginia Electric and Power Company (d/b/a Dominion Virginia Power) ("Dominion") has applied for a Prevention of Significant Deterioration ("PSD") Permit for a nominal 1300 MW natural gas fired combined cycle power station in Warren County, Virginia. Dominion is committed to full compliance with all applicable air emission regulations and associated limits, as well as the additional requirements included in the specific draft permit language. As stated previously by Pamela Faggert, Chief Environmental Officer for Dominion at the SAPCB's public hearing for the permit, this facility will be at or near the top of the EPA's national clearinghouse list of facilities with the best air pollution control technologies. The facility emissions will be controlled beyond PSD Best Achievable Control Technology (BACT), to levels that are considered to be Lowest Achievable Emissions Rates, for the primary components of our emissions. Dominion has previously submitted proposed language regarding emissions offsets.

This proposed power station is vitally important for Dominion Virginia Power to continue meeting our obligation to provide safe, reliable, cost effective energy to the growing needs of our customers. This station directly addresses the increasing customer demand for electricity. The 2010 load forecast produced by PJM (the regional transmission system operator), projects that capacity requirements for the Dominion transmission zone will grow by 5,600 MW from 2010-2019. Dominion's projections in its Integrated Resource Plan filed with the Virginia State Corporation Commission show that it will need the natural gas-fueled Warren County Power Station to be operational no later than 2015 to meet projected customer demand. Additionally, building this power station is consistent with the Virginia Energy Plan's call for decreased reliance on imported energy and more emphasis on electricity generated in the state to serve native load.

Dominion is providing the following information in support of its permit application to address questions on the project related to: (1) selection of the turbine manufacturer; (2) Volatile Organic Compound ("VOC") emissions; (3) location, size and other characteristics of the facility; (4) $PM_{2.5}$ modeling; and (5) mercury emissions. Pursuant to applicable regulations, Dominion

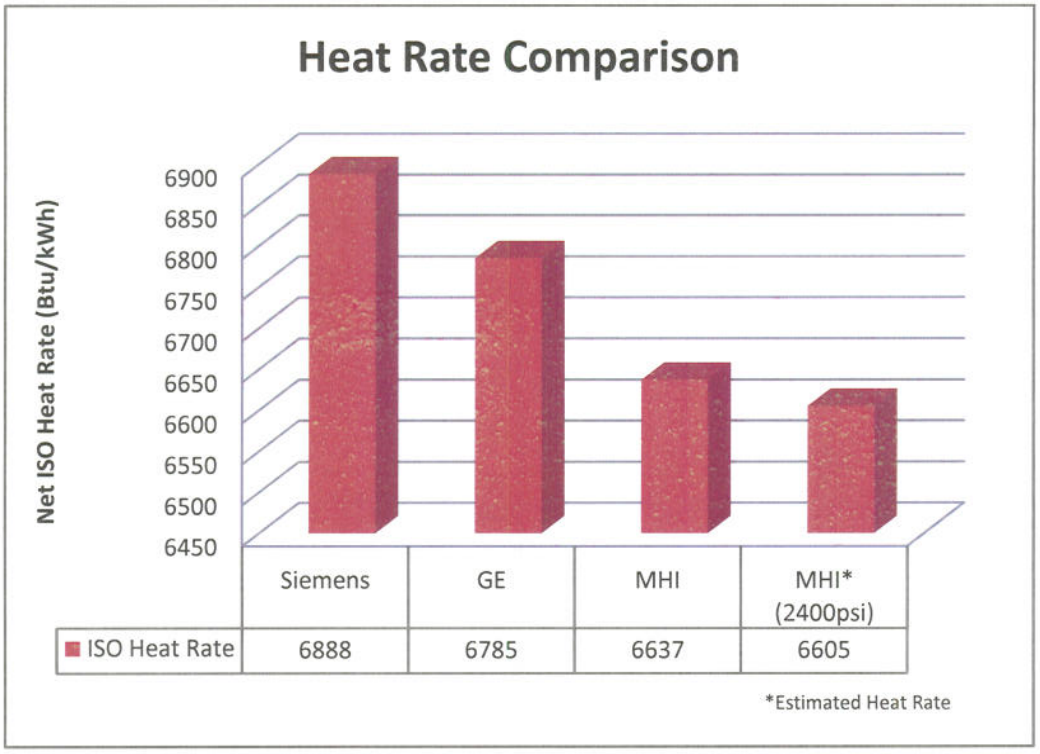
will be providing a response to comments within ten days of the close of the public comment period.

1. Selection of the Turbine Manufacturer

Questions have been raised regarding the selection of the turbine manufacturer for the project. As an initial matter, the generating equipment proposed in the original permit issued in 2004 is no longer available in the marketplace. Since that time, gas turbine suppliers have increased the size and efficiency of the equipment available in the market.

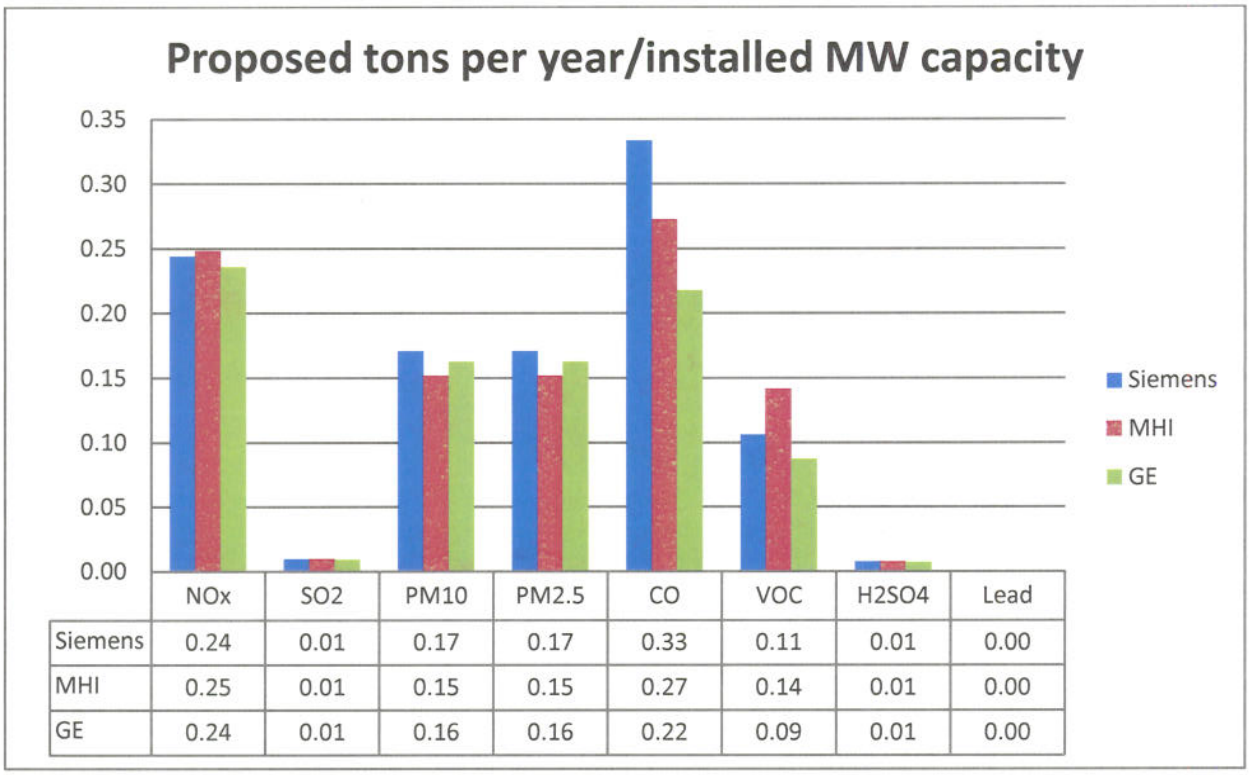
To select a new manufacturer, Dominion requested and received proposals from multiple competitive gas and steam turbine bids for the Warren County Power Station. Specifically, Dominion considered three proposals for the combustion turbines. Mitsubishi Heavy Industries (MHI) proposed 501GAC gas turbines, General Electric (GE) proposed 7FA.05 gas turbines and Siemens proposed SGT6-5000F gas turbines. All performance characteristics and environmental emissions were included in the evaluation to make the equipment selection for the gas turbines and associated steam turbine. Final selection of the MHI 501 GAC combustion turbine has allowed us to work closely with MHI and reduce the emissions compared to those requested in the original permit application.

During the evaluation period, Mitsubishi proved to have the best heat rate (*i.e.*, the highest fuel efficiency or lowest fuel consumption per unit of output) of all the bidders with an 1800 psi steam turbine. Dominion negotiated with MHI to improve the heat rate even further by increasing the operating pressure of the steam turbine to 2400 psi to allow for an estimated 0.5% heat rate (*i.e.*, efficiency) improvement.



Three (3) Mitsubishi M501GAC Gas Turbines paired with a Mitsubishi 2400 psi TCF4 Steam Turbine were selected because of their superior performance.

Comparing the three technologies, NO_x, SO_2, PM_{10}, $PM_{2.5}$, H_2SO_4, and Lead emissions are virtually equivalent. The CO and VOC emissions, however, varied across the three bidders. After we selected the MHI technology for this facility based on its superior efficiency, we requested that MHI provide revised estimates of VOC emissions during startups. As discussed in more detail in the next comment, with further engineering and environmental analysis, MHI was able to provide lower estimates of VOC emissions. No single commercially available unit is the best for all pollutants. The selected vendor is determined to have the best overall performance. In addition, Dominion's use of the highest efficiency equipment is consistent with EPA's proposed guidance on PSD BACT for greenhouse gases. EPA, *PSD and Title V Permitting Guidance for Greenhouse Gases (November 2010).*



	NOx	SO2	PM10	PM2.5	CO	VOC	H2SO4	Lead
Siemens	0.24	0.01	0.17	0.17	0.33	0.11	0.01	0.00
MHI	0.25	0.01	0.15	0.15	0.27	0.14	0.01	0.00
GE	0.24	0.01	0.16	0.16	0.22	0.09	0.01	0.00

2. VOC Emission Limits

Dominion has been asked whether the proposed VOC emissions limits can be reduced. The following comments address the methodology for determining these limits, as well as a request to reduce the VOC limits through a proposed permit condition change.

A. VOC Formation and Control

VOCs are formed from the incomplete combustion of natural gas in a combustion turbine. Turbine manufacturers generally guarantee very low VOC emissions from their units at normal load. However, their assumed emissions of VOCs during startups (and to a much lesser extent, shutdowns) are typically higher than VOC emissions during normal operations. VOC emissions are controlled by good combustion practices and add-on oxidation catalyst. The Warren County Power Station will be equipped with oxidation catalysts. These catalysts are installed for the primary purpose of reducing carbon monoxide (CO), but will have the beneficial effect of controlling VOCs as well. The catalysts do not immediately reach their full VOC reduction

potential during a startup because they must warm up before they are effective in VOC control. This is coincident with the time that a unit reaches about 50%-60% load, when formation of the VOCs from the combustion turbine decreases dramatically. There is no other control device that can be used for VOC emissions during startup.

Dominion's January, 2010 permit application included startup and shutdown emissions estimates for three different combustion turbine vendors. Subsequently, Dominion selected the MHI design. At Dominion's request, and with further engineering and environmental analysis, MHI was able to provide lower estimates of VOCs during hot starts because the HRSG temperatures are already within the proper range to allow the oxidation catalysts to reduce VOCs. Hot starts are those that occur within eight (8) hours of a unit shutdown, and are not dramatically affected by the length of warm-up time needed for the HRSG equipment. By reducing the estimated VOC emissions during a hot start, Dominion is able to achieve a lower limit of 181.0 tons of total annual VOC emissions from the combined cycle units and duct burners. This is a significant reduction from the 230.8 tons VOC in the draft permit.

Our permit application, based on past operating experience, assumed the following startup scenarios for each combustion turbine to provide estimates of annual emissions:

- Hot starts (restart less than 8 hours following shutdown): 174 per year
- Warm starts (restart between 8 and 72 hours following shutdown): 15 per year
- Cold starts (restart more than 72 hours following shutdown): 6 per year

The following numbers of startups were utilized by Possum Point Unit 6, a combined cycle facility that is dispatched into the Northern Virginia market. Warren County Power Station is required to have the same operating flexibility to meet the business objectives of the facility:

	Cold	Warm	Hot
CT 6A Starts 11/09-11/10	6	14	24
CT 6B Starts 11/09-11/10	4	13	20
Average	**5**	**13.5**	**22**

	Cold	Warm	Hot
CT 6A Starts 11/08-11/09	6	28	37
CT 6B Starts 11/08-11/09	4	24	42
Average	5	26	39.5

	Cold	Warm	Hot
CT 6A Starts 11/07-11/08	19	52	167
CT 6B Starts 11/07-11/08	14	43	174
Average	16.5	47.5	170.5

	Cold	Warm	Hot
Average (2 year)	**5**	**19.75**	**30.75**

	Cold	Warm	Hot
Average (3 year)	**8.83**	**29**	**77.33**

Numerous factors, including weather and gas prices change the number of required starts to meet customer demands. Typically, however, when natural gas prices are high, as they were in 2008, the units cycle more to meet customer and market demand. When natural gas prices are low, the units are dispatched and continue to run for longer periods. Dominion's customers need the flexibility to dispatch the Warren County Power Station as needed in order to meet customer demands.

Based on this updated analysis, the applicant is requesting that Permit Condition 17 be changed as follows:

Volatile Organic Compounds ~~230.8~~ 181.0

No other changes to the permit are necessary to reflect this lower emissions limit.

3. The Location, Size and Purpose of the Plant

Questions have been raised about the size, location and purpose of the plant and whether there is any flexibility in those factors. Dominion provides the following information in this comprehensive response to address these comments.

This larger, energy efficient state–of- the-art single fuel natural gas facility will provide clean energy to support growing energy demands, with lower emissions than that produced by increasing energy output from the most likely alternative, older vintage existing fossil fuel generation resources. Construction of this larger and more efficient power station provides economies of scale and cost efficiencies that deliver enhanced value for Virginia Electric and Power Company customers.

The size of the proposed Warren County Power Station directly addresses a growing customer need for electricity. The 2010 load forecast produced by PJM (the regional transmission system operator), projects that capacity requirements for the Dominion transmission zone will grow by 5,600 MW from 2010 to 2019.

Additionally, building this station is supporting the goals of Virginia's Energy Plan, which calls for decreased reliance on imported energy and more emphasis on electricity generated in the state to serve native load. Virginia ranks only behind California on the amount of energy it imports to meet its energy needs.

Dominion's Integrated Resource Plan filed with and approved by the Virginia State Corporation Commission (SCC) includes the Warren County Power Station coming online by 2015.

This location is beneficial in easing the strain on the transmission system serving Northern Virginia. By locating the station in Kelly Industrial Park in Warren County, this station will directly tie into Virginia Electric and Power Company's existing 500kv transmission line that runs directly through this property. Network impact studies conducted thus far by PJM do not indicate the need for construction of any new high-voltage transmission lines outside the plant

property. In addition, this location will improve the stability and reliability of the transmission system serving Northern Virginia.

The location in Kelly Industrial Park offers several additional benefits. A natural gas pipeline is located within five miles of the site. Also, water is anticipated to be purchased from the Town of Front Royal, which holds current authorization for the water withdrawal from the Shenandoah River. Wastewater is planned to be processed by the Town of Front Royal through an Industrial User Permit. The Warren County Board of Supervisors has approved a Conditional Use Permit for the contemplated location, design and size of this facility.

The stack heights of 175 feet used for the combined cycle units are the same as used in the previously permitted project. The height is less than that allowed by EPA to be used for dispersion purposes. Based on the current facility configuration, the EPA-allowed height would be about 214 feet. Lowering the heights of the stacks below the current design of 175 feet would increase local impacts. This stack height is the lowest practical height to ensure sufficient dispersion to minimize any local impacts.

4. PM 2.5 modeling

On July 18, 1997 the Environmental Protection Agency established national ambient air quality standards ("NAAQS") for $PM_{2.5}$. They were updated in October of 2006. 71 Fed. Reg. 61224 (Oct 17, 2006). Dominion has submitted computer modeling, which demonstrates that the Dominion Warren County Project would not cause or contribute to a violation of the NAAQS.

On September 30, 2010, EPA issued a final rule for PSD increment for $PM_{2.5}$ ("$PM_{2.5}$ Increment Rule"). 40 C.F.R. 52.12(b)(14(c)), 75 Fed. Reg. 64864, 64890 (Oct. 20, 2010). The $PM_{2.5}$ increment rule will be effective on December 20, 2011, 60 days after October 20, 2010, the date it was published in the Federal Register. 75 Fed. Reg. 64864 (Oct. 20, 2010). The $PM_{2.5}$ rule has a "trigger date" of one year from that publication, *i.e.*, on October 20, 2011, at which time the increment will commence to be implemented through the PSD permitting process. *Id.* at 64887. After that date, applicants for PSD permits must demonstrate that emissions from the proposed source will not exceed PSD increments for $PM_{2.5}$. *Id.* at 64887 -88. If a source permit is issued before the trigger date, the Project need not demonstrate compliance with the new $PM_{2.5}$ increment. *Id.* EPA establishes increments, which are much lower than the actual air quality standards, in order to help ensure that the air quality standards are not exceeded.

Even though the trigger date is not until October 20, 2011, the rule establishes the date of publication, October 20, 2010, as the "major source baseline date." *Id.* at 64887. New emissions from major stationary sources that occur after this date will not be included in the baseline, but instead, will consume increment even though they are permitted before the trigger date. *Id.* at 64868 and 64887. Similarly, any reduction in emissions from a unit in the baseline after the major source baseline date will expand increment. *Id.* at 64868.

Computer modeling is used to determine in the permitting process whether a project causes or contributes to an exceedance of PSD increment. Warren County Power Station is not required to model for compliance with PM increment. As noted above, for permits issued before the trigger date, increment consumption analysis is not required. An increment analysis is not required unless and until an additional new PSD source locates in an area that would require the inclusion of the Warren County Power Station in future modeling as a nearby, increment-consuming source. At that time Warren County Power Station's emissions would be included in the inventory of existing sources at its actual operating rate. 40 C.F.R. Part 51 App W Table 8-2.

Further, the current state of modeling technology does not account for the reductions in secondary $PM_{2.5}$ that will occur as a result of emissions reductions at other sources, including the previously agreed upon conversion of Bremo Power station from coal to natural gas. Because these reductions are to existing emission sources, and will occur after the major source baseline date, they effectively "expand" increment. Thus, any modeling done now using the proposed Warren County Power Station's potential to emit would be more conservative than would be required in the future because future increment modeling would incorporate the reductions in emissions from other sources, including Bremo, and would also allow modeling of the Warren facility at its actual emissions rates, as opposed to its higher, allowable emissions.

Dominion recognizes that $PM_{2.5}$ modeling may be required in the future. However, the Virginia Department of Environmental Quality has requested that Dominion provide $PM_{2.5}$ increment modeling results now. The modeling demonstration submitted in June, 2010 showed that the facility's impacts on ambient $PM_{2.5}$ concentrations would not cause or contribute to a violation of the NAAQS, but would, by itself, consume more than 100% of the new increment if it were applicable. As stated above, this is without consideration of the benefits of other emissions reductions, including Bremo, that expand the increment. However, even though it is not required,

Dominion is now providing a modeled scenario demonstrating that Warren County Power Station would not cause or contribute to a violation of the increment. (See Table 1 below.) Our consultant, AECOM, has provided the computer modeling files directly to DEQ today under separate cover.

The updated modeling reflects that two more stringent amendments to the currently proposed permit terms would be necessary to meet increment, specifically:

Condition 16 of the permit would be revised to reflect new short term $PM_{2.5}$ limits of 8.0 pounds per hour of PM_{10} and $PM_{2.5}$ for operation without duct burners and 14.0 pounds per hour of PM_{10} and $PM_{2.5}$ for operation with duct burners; and Condition 19 of the permit would be revised to include the underlined additions.

> 19. Emission limits: Duct Burners - Emissions from the operation of each duct burner (DB1, DB2 &DB3) operating independently from each combined-cycle system (T1, T2 and T3) shall not exceed 54 ppm of oxides of nitrogen (expressed as NO_2) at 15% O_2. The duct burners shall not operate between the hours of 10 pm and 5 am during the period between September 1st and April 30th, except that the duct burners may be operated during a PJM ISO declared emergency.
>
> Va Code 10.1 1307.02.; Va Code 10.1-1307.3 A.5.; 9 VAC 5-80-1180; 9 VAC 5-50-410; 40 CFR 60.4320.

As mentioned above, the increment modeling is not required for the Warren County facility permit, and will not be required for other PSD permit applications until October 20, 2011. Therefore, there is no requirement to impose additional restrictions on the operation of this facility.

5. Mercury Emissions

Questions have been raised about mercury emissions from the proposed facility. The plant will have trace levels of mercury emissions because mercury is a naturally occurring metallic element present in natural gas. Due to its ultra-low emissions of hazardous air pollutants the facility is not subject to Maximum Achievable Control Technology Requirements.

The estimated maximum mercury emissions from the MHI gas turbines planned for the Warren County project are 2.61 lb/yr based on the EPA's AP-42 emission factor of 2.55E-07 lb/MMBtu.

The AP-42 emission factor is based on an April 4, 1993, stack test and a May 17, 1990, stack test.[1] Results for all three runs from the 1993 stack test were below the detection limit of 3.6E-07 lb/MMBtu. For the 1990 test, two of the runs were below the detection limit and one run yielded a result of 3.3E-07 lb/MMBtu.[2] EPA based the emission factor on the average of one half the 1993 detection limit and the value detected in the 1990 test.

EPA's MACT floor analysis for the proposed Industrial/Commercial/Institutional (ICI) MACT standard lists a limit mercury emission limit of 2.0E-07 lb/MMBtu for both existing and new boilers and process heaters used to burn natural gas, propane, LPG and refinery gas.[3]

Given that the Warren facility is exempt from MACT, that EPA has not established a MACT standard for mercury emissions from combined cycle combustion turbines, and that EPA's AP-42 emissions factor and proposed MACT floor for natural gas combustion in other technologies are similar numbers, the emission information provided in the permit application is justified.

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[1] Chapter 1: External Combustion Sources, AP 42, Fifth Edition, Volume I | Clearinghouse for Emission Inventories and Emissions Factors | Technology Transfer Network | US EPA (Background Document and Related Information).

[2] Stack test detection limits for mercury vary between stack tests depending upon the sampling duration, the final analytical technique and other source specific factors

[3] MACT Floor Analysis for proposed rule, EPA-HQ-OAR-2002-0058-0815/0815.1, April 2010. Industrial/Commercial/Institutional Boilers and Process Heaters | Technology Transfer Network Air Technical Web Site | US EPA

Table 1. $PM_{2.5}$ Increment Modeling Results

Pollutant	Averaging Period	Model Concentration ($\mu g/m^3$)(1)	PSD Increment ($\mu g/m^3$)	Complies (Y/N)?
Class II Area Modeling				
$PM_{2.5}$	24-hour(2)	2.17	9	Y
$PM_{2.5}$	Annual(3)	0.25	4	Y
Class I Area Modeling				
$PM_{2.5}$	24-hour(2)	1.95	2	Y
$PM_{2.5}$	Annual(3)	0.10	1	Y

(1) Worst-case modeled concentration over all ambient temperature/load conditions evaluated.
(2) Highest second highest modeled concentration over the five modeled years.
(3) Highest annual average modeled concentration over the five modeled years.